**Activity: Popping Percentage Composition**

In each kernel of popping corn, there is a small drop of water in a circle of soft starch. All of these substances are encased in a hard shell. When heated, the water expands and builds up pressure against the hard outer surface, eventually exploding and turning the kernel inside out into an enjoyable light snack: popcorn.

Have you ever wondered why some kernels never pop? Here’s one possible explanation. Imagine trying to inflate a balloon with a hole in it. Air loss through the hole prevents the balloon from fully inflating. Similarly, a small crack in the kernel may allow water to escape before it can be superheated.

In this activity, you will determine the mass of water released by a sample of popcorn by comparing the mass of the popcorn before and after popping. This data will be used to determine the percentage by mass of water in popping corn.

**Safety:**

Food in the lab is always an issue to be **dealt with carefully**. Consider having “research corn” (corn that is popped for the purpose of investigation and **must not be eaten**) and **treat the samples as if they were lab chemicals.** At the end of the activity, the popcorn should be disposed of.

**Purpose:**

To determine the percentage (by mass) of water in popping corn

**Equipment & Material:**

Pot with the lid

Hot plate

Plastic bag

Balance

Popping corn

Oil

**Procedure:**

1. Plan a procedure to determine the percentage (by mass) of water in the popping corn.
2. Develop a mathematical equation that you will use to calculate the percentage of water in the popping corn.

**Analyze and Evaluate**

1. Determine the percentage of water in popping corn.
2. Analyzing error is an important part of any investigation. Some inaccuracies result from **human error**—mistakes made by the experimenter. **Experimental errors** are inherent in the design of the investigation or in the tools or techniques used. Classify each of the following **as either a human error or an experimental error**. In each case, predict the effect that this error could have on the percentage of water calculation. **T/I**

(i) not all of the popping corn was massed

(ii) some kernels did not pop

(iii) a student had to hold the bag to prevent it from falling over as its mass was measured

(iv) the initial mass of the bag was not subtracted from the total mass of bag and popcorn

1. List the sources of error in your investigation. Explain how you could avoid or minimize each one.

Answers (Analyze and Evaluate)